

PROPOSITION SUJET de MASTER 2017-2018

TITRE : Development of a high-throughput screening approach to the discovery of new interactors controlling fungal pathogenicity

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Nom du candidat éventuellement proposé :

S'il n'est pas retenu, acceptez-vous un autre candidat ?

Oui - Non

Description du sujet au verso ⇒

Sujet (objectif, démarche et technique, collaboration(s),...):

Sustainable supplies of food, bioenergy and plant-derived chemicals depend on plant growth and product storage. One of the major threats in agriculture is plant health that gets continuously compromised by various diseases, which are responsible of more than 20% in average of crop yield losses worldwide (Scott 2005). For example the pathogenic fungi *Botrytis cinerea* (Gray Mold) is known to infect more than 200 plant species including several vegetable crops (e.g. tomato and cucumber) and by itself is responsible of up to 30% strawberry crop losses (Mertely *et al.*, 2000). In contrast *Magnaporthe oryzae* affects less plants but is known to be the most devastating disease of rice worldwide (Wilson and Talbot, 2009). Recently, it became an emerging disease in South America and a growing threat to global wheat production (Cruz *et al.*, 2012).

One of the limiting factors to progress in developing novel, rapid and efficient strategies to fight plant diseases with pesticides, breeding or biotechnologies is the lack of knowledge of molecular mechanisms (on the fungal and plant sides) involved during plant infection.

The proposed project will focus on developing a high-throughput screen one or both fungal models *Botrytis cinerea* and *Magnaporthe oryzae* to identify new key players from the fungus that control its aggressive traits involved in colonization and death of host-plants. We will use newly develop vectors for high-throughput transformation and to manipulate expression of multiple fungal genes to identify and characterize new ones involved in the fungal pathogenicity. In addition of the scientific knowledge, this project will offer the opportunity to learn a great diversity of techniques related to molecular biology, fungal transformation, microscopy and more.

References:

- Cruz CD, *et al.* (2012) Preliminary Assessment of Resistance Among U.S. Wheat Cultivars to the Triticum Pathotype of *Magnaporthe oryzae*. *Plant Dis* 96 (10):1501-1505.
- Mertely *et al.* 2000. Comparison of sanitation and fungicides for management of *Botrytis* fruit rot of strawberry. *Plant Dis.* 84:1197-1202.
- Scott 2005, Plant Disease: A Threat to Global Food Security. *Annual Review of Phytopathology*, 43: 83-116
- Wilson RA, Talbot NJ (2009) Under pressure: investigating the biology of plant infection by *Magnaporthe oryzae*. *Nat Rev Microbiol* 7 (3):185-195.